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HANDMADE GOURD-BANJO, PART 1: PREPARING THE GOURD BODY

From "Handmade Music"
episode DHMM-206 -- More Projects »

Cultural identity is defined in part in the culture's music. At the Museum of Appalachia, where host Jeff Wilson introduces this episode, a variety of musical instruments indigenous to the Southern Appalachian region are on display. For many, these musical instruments, and the sounds they produce, help define the spirit of this historic mountain region. But the history of one of those instruments, the banjo, actually begins half a world away -- in Africa. Its earliest incarnations can be traced back at least five centuries.

The traditional gourd banjo was first played in Africa more than five centuries ago.

In this edition of *Handmade Music* we focus on the original incarnation of the instrument -- the gourd banjo. All the steps in creating a modern replica of this ancient instrument are demonstrated by luthier Matt Morelock.

Host Jeff Wilson, at the Museum of Appalachia in Norris, Tennessee, holds a traditional gourd banjo.

Materials used in this episode:

Large dried gourd
Calfskin or goatskin
Quarter-sawn mahogany stock
Ebony for the nut
White pine for bridge
Rawhide strip
Wooden dowel
Wooden blocks
Gut string
Violin pegs
Peg reamer
Band saw
Cordless drill and bits
Bit-aligning tool
Hand saw
Scraper
Files and rasps
Sharp chisel
Sandpaper
Hole punch
Poster board
Woodworker's glue
Clamps
Gunstock finish
Carpenter's pencil

The modern-day banjo -- the one that's familiar to aficionados of bluegrass and traditional American music -- has evolved quite a bit since its earliest incarnation. Modern banjos made in the "old time" style have an open back. The bluegrass counterpart has a closed back with a resonator built in. The gourd banjo, which was built as far back as the late 1500s or so, has some characteristics in common with its modern counterparts -- since all are essentially a head stretched over a drum body and a wooden neck.

It has two main components -- the gourd and the neck. The body is made from an actual dried gourd and the instrument traditionally has gut strings rather than steel. This neck consists of several components including the fingerboard, peg head and spike.

Part of the unique experience of creating a gourd banjo is the freedom to "veer off course." Design changes and artistic expression in carving don't necessarily affect the sound of the instrument adversely, and we see evidence of that freedom in Matt's work.

The process begins with hollowing out the gourd and cutting the neck from mahogany. After careful measurement and shaping, Matt inserts the spike of the neck through the gourd. The taper of the spike creates a bond to hold the two components together. Finally an oil finish is applied and gut strings are added. By show's end Matt Morelock is playing the gourd banjo and creating the kind of music heard centuries ago.

Luthier and banjoist Matt Morelock.

Preparing the Gourd Body

Matt begins by cutting open the gourd to clean it, cutting off the top just as one would cut open a pumpkin to make a jack-o-lantern (**figure A**). Inside the gourd are seeds and fibers.

Figure A

Matt then begins the labor-intensive task of thoroughly cleaning the inside. This prevents the gourd interior from molding and decaying. Material left in the gourd would also dampen the sound of the banjo.

Scraping is easiest if the gourd is soaked overnight. The water softens the skin and it naturally falls away from the sides and can be removed (**figure B**).

He then uses a scraper, elbow grease and most of an afternoon to remove the stubborn remains.

Figure B

Matt started by carving a small hole so that he could get inside and clean the guts out of the gourd. He now needs to enlarge the hole to its final diameter. The larger hole is needed so Matt can stretch calfskin across it to essentially create a "drum." He uses a rasp to gradually and symmetrically increase the diameter enlarge the hole to about nine inches.

Then, by rubbing the gourd against a flat sandpaper-board he slowly eases into the size he needs (**figure C**). This gives him complete control without taking away too much material. The sandpaper also smoothes the perimeter and that will be important later because a sharp edge might damage the calf skin when the head is stretched across the opening.

Figure C

The next step is to work on the part of the banjo which will hold this head to the gourd -- a series of wooden pegs. Rawhide strips thread through the calfskin to secure it, but the strips are tethered to sixteen pegs poking through the gourd's midsection (**figure D**).

The pegs are made from quarter-inch wooden dowels (**figure E**), and their locations are marked with a template.

Figure D

Figure E

Matt creates the template with poster board shaped and sized like the gourd's opening (**figure F**). He equally distributes sixteen marks along the template's edge.

The points are transferred to the gourd, first along the rim, and then about five inches below (**figure G**).

There's not a lot of precision to this process, and that's part of the beauty of building gourd banjos. Originally, these instruments were built with a variety of tools, materials and techniques. No two were ever exactly the same. The character of each instrument was -- and is -- enhanced by great latitude in measurement and creativity.

Figure F

Figure G

With sixteen marks evenly dispersed around the gourd, Matt drills quarter-inch holes at each position. He saves drilling two of them for later, but he sticks a couple of "can't miss" reminders over the marks. These spots mark the future home of the neck and the tailpiece so he can't really put the pegs there just yet.

He uses patches of blue tape to mark where the neck-joint will be and where the tail-piece will come out (**figure H**).

But the other fourteen pegs can go in at this stage. Matt cuts three-quarter inch lengths of the wooden dowel. The diameter is a quarter inch -- like the drill-bit -- so the fit should be fairly snug. Wood glue helps secure the pegs (**figure I**).

Figure H

Figure I

In the segment that follows, work gets underway on the gourd-banjo's neck.

RESOURCES:

That Half-Barbaric Twang: The Banjo in American Popular Culture
(Music in American Life)
Author: Karen Linn
Publisher: University of Illinois Press; Illini Books ed edition (August 1994)
ISBN: 025206433X
To order this book from Amazon.com, click here.

America's Instrument: The Banjo in the Ninteenth Century
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GUESTS:

Matt Morelock, luthier, banjoist, music teacher, happy camper.
On the web: http://www.wdvx.com/DJS/MattM.htm

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HANDMADE GOURD-BANJO, PART 2: BUILDING THE NECK

From "Handmade Music"
episode DHMM-206 -- More Projects »

In this episode of DIY's *Handmade Music*, luthier Matt Morelock creates a gourd banjo -- a primitive version of the instrument that was first played around five centuries ago. The body of the banjo is made from an actual hollowed-out gourd. In this segment, after having prepped the gourd, work gets underway on the mahogany neck.

A traditional gourd banjo on display at the historic Laurel Theater in Knoxville, Tennessee. The theater and its parent organization Jubilee Community Arts is dedicated to preserving the culture and traditional performing arts of the Southern Appalachian region -- as well as the long heritage and cultural roots that gave rise to those traditions.

Materials used in this episode:

Large dried gourd
Calfskin or goatskin
Quarter-sawn mahogany stock
Ebony for the nut
White pine for bridge
Rawhide strip
Wooden dowel
Wooden blocks
Gut string
Violin pegs
Peg reamer
Band saw
Cordless drill and bits
Bit-aligning tool
Hand saw
Scraper
Files and rasps
Sharp chisel
Sandpaper
Hole punch
Poster board
Woodworker's glue
Clamps
Gunstock finish
Carpenter's pencil

Safety Alert: Always wear eye protection and follow proper safety precautions when using power tools.

Building the Neck

The banjo's neck is made from a single piece of mahogany stock. Luthier Matt Morelock marks the neck profile (**figure A**) which includes three components. From a continuous forty-one inch piece of wood, Matt gets a five-inch headstock, a nineteen-inch neck, and seventeen inches for the dowel-stick. The dowel-stick is also called a spike.

The heel is at the base of the neck and Matt free-hands its shape. The heel joins the neck and the gourd so it needs to be pretty substantial. After all three neck components are sketched out on the stock, Matt cuts the profile using a band saw (**figure B**).

Figure A

Figure B

The width of the dowel stick is mapped out next and it's trimmed-up again with the band saw. At this point Matt wants the spike to be three-quarters of an inch wide. While still at the band saw, he cuts out a peg head at the other end of the stock.

Those cuts create a rough blank (**figure C**) that can soon be transformed into the finished neck.

Transforming the rough blank begins by tapering the spike or dowel-stick. Most of the spike is unseen, but it's performing a vital task. As it passes through the gourd its taper wedges the neck and the gourd together (**figure D**). It really is the only thing holding the two components together.

The thickness from the heel to the end of the spike is decreased slightly with a band saw, and then with a plane.

Figure C

Figure D

Matt also shapes the heel at this stage. A contour-gauge helps replicate the gourd's shape (**figure E**), and from that outline Matt trims away most of the wood that gets in the way of a perfect fit.

When he cuts away the excess he's ready to begin the first of many test fittings.

The neck and the gourd's head will be on the same plane. With a T-square, Matt is able to transfer the dowel stick's position (**figure F**). He determines the spike is five inches under the plane of the neck, so it will enter the gourd five inches under the plane of the head.

Figure E

Figure F

Next he cuts an entry hole for the dowel stick (**figure G**). It's not wise to cut it to the final dimension just yet. The fit is so critical that cutting too big would be a disaster.

Once the entry hole has been cut, Matt pushes the spike through the gourd until it contacts the other side (**figure H**).

Figure G

Figure H

The location of the contact gives a reference for marking the spike's exit hole. It is critical that Matt monitor the neck's plane. It should remain level with the head while he marks the position and size of the opening (**figure I**).

He cuts this one smaller as well, again mindful of the snug fit required. Adjustments to the fit are made a little at a time. Patience is a virtue, but for luthiers it's the difference between success and firewood -- so Matt takes it slow. After several rounds of filing and adjusting the fit, the spike passes through so that it fits snugly (**figure J**).

Figure I

Figure J

Though he now has achieved a good snug fit where the dowel stick passes into the gourd, he still will have to fit the heel to the gourd since it is not yet flush (**figure K**). The fit will be addressed later when Matt carves the neck.

Matt finishes roughing in the neck with his band saw. He already cut a profile, but now he gets the width closer to its final size (**figure L**). With the neck taking shape (**figure M**), Matt also sands both sides of the peg head.

In the segment that follows, work continues with shaping of the neck and peg-head.

Figure K

Figure L

Figure M

RESOURCES:

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HANDMADE GOURD-BANJO, PART 3: SHAPING THE NECK AND PEG-HEAD

From "Handmade Music"
episode DHMM-206 -- More Projects »

In this episode of *Handmade Music*, luthier Matt Morelock creates a gourd banjo -- a primitive version of the instrument that was first played around five centuries ago. In this third segment, after having prepped the gourd and rough-cut the mahogany neck, work continues with shaping of the neck and peg-head.

It may not look exactly like the ones that Ralph Stanley or Bela Fleck play, but this is what banjos were like five centuries ago. The banjo was originally a traditional African instrument and -- like this contemporary replica displayed at the Laurel Theater in Knoxville, Tennessee -- was made using goatskin and a hollowed out gourd.

Materials used in this episode:

Large dried gourd
Calfskin or goatskin
Quarter-sawn mahogany stock
Ebony for the nut
White pine for bridge
Rawhide strip
Wooden dowel
Wooden blocks
Gut string
Violin pegs
Peg reamer
Band saw
Cordless drill and bits
Bit-aligning tool
Hand saw
Scraper
Files and rasps
Sharp chisel
Sandpaper
Hole punch
Poster board
Woodworker's glue
Clamps
Gunstock finish
Carpenter's pencil

Safety Alert: Always wear eye protection and follow proper safety precautions when using power tools.

So far, Matt has prepared a gourd for the banjo body and cut out a rough neck-blank from mahogany. After perfecting the spike and rough-shaping the peg-head or headstock, the neck and the heel, Matt begins carving the neck .

First, he creates a radius or a symmetrical arch down the back of the neck (**figure A**). Its apex should be at the neck's centerline so Matt traces a reference point down the middle. He uses a rasp on the mahogany to shape the curve.

The rasp is an effective tool that can remove wood quickly so, before he gets carried away, Matt places a reminder on the stock. He marks an "X" on the stock in the approximate location of where the 5th-string peg will be installed (**figure B**) to avoid removing too much material while carving the radius.

Figure A

Figure B

Even though the rasp makes easy work of the mahogany results don't come easy. Matt spends most of an evening getting the radius just right.

Measurements are important but they don't mean nearly as much to Matt as the feel of the neck in his hands (**figure C**).

When he's satisfied with the fit he uses the rasp again to perfect the joint between the gourd and the neck. When the rasp has done its job, Matt begins a slow process of test fitting the neck and the gourd. The neck will not fit the first time. Matt just chips away any obstructions he notices. There's not a lot of room for error here. The gourd is an odd shape, and the heel (**figure D**) has to match perfectly.

Figure C

Figure D

When the heel and gourd seem perfectly aligned, Matt puts away the rasp and clears final obstructions with sandpaper and files. He runs through several grits of sandpaper (**figure E**) until the neck feels smooth as glass. When it does, Matt can still merely imagine the way this gourd banjo will ultimately sound.

Figure E

The shape of the peg head can be extremely ornate or (as Matt has chosen) fairly traditional with rounded corners. He marks his outline with a compass and uses a rasp to form the peg head in short order. Sanding cleans up the work before he begins placing the tuning pegs.

Matt then marks the peg head to indicate the placement of the tuning pegs (**figure F**). "When placing your tuning pegs," he says, "it's important that you have enough distance from the edge of the peg hole to the edge of the head stock so that if it gets knocked or bumped it's not going to rip out of the side of the headstock."

Figure F

While drilling, it's important to keep the bit perpendicular to the peg head's surface so the tuning pegs will uniform and consistent. Matt uses a bit-aligning tool to make this process more precise (**figure G**).

And after he drills the hole for the fifth tuning peg, he sizes them with a violin-peg-reamer (**figure H**). "As we turn it in one direction," he says, "the blades are going to cut the proper taper in which we can fit the violin peg. Now it's important with these peg reamers that a little goes a long way and it's easy to over do it and once again it's a whole lot easier to take away material that it is to add material."

Figure G

Figure H

Now Matt is on the home stretch. He needs only to put all the pieces together to hear what this banjo will sound like. In the segment that follows, it all comes together with the pegs, tail-piece and strings.

RESOURCES:

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HANDMADE GOURD-BANJO, PART 4: PEGS, TAIL-PIECE AND STRINGS

From "Handmade Music"
episode DHMM-206 -- More Projects »

Luthier Matt Morelock creates a gourd banjo -- an early version of the instrument that originated in Africa five centuries ago. In this final segment, he installs the pegs, tail-piece and strings so that this new instrument -- with ancient origins -- may be heard for the first time.

The gourd banjo, first played in Africa more than five centuries ago, traditionally has no frets on the neck. "With a fretless instrument," says this banjo's creator Matt Morelock, "you have a quite a bit more leeway because you can slide up to the note or down to the note if you're just a little bit off. It gives a bit more room for expression -- for 'bending around the notes.'" When he's not building gourd banjos, Matt is a musician, music teacher and the host of *The Happy Camper* program on the world-renowned roots-based radio station WDVX.

Materials used in this episode:

Large dried gourd
Calfskin or goatskin
Quarter-sawn mahogany stock
Ebony for the nut
White pine for bridge
Rawhide strip
Wooden dowel
Wooden blocks
Gut string
Violin pegs
Peg reamer
Band saw
Cordless drill and bits
Bit-aligning tool
Hand saw
Scraper
Files and rasps
Sharp chisel
Sandpaper
Hole punch
Poster board
Woodworker's glue
Clamps
Gunstock finish
Carpenter's pencil

Safety Alert: Always wear eye protection and follow proper safety precautions when using power tools.

Though there are no frets on this particular banjo, there will of course be strings. That means Matt has to install a nut to guide them. First he carves away a slot -- or channel -- to hold the nut in the neck (**figure A**).

Banjo nuts can be made from several materials, but Matt likes ebony. For now he glues the ebony into the channel (**figure B**).

While the glue dries, he applies a little finish to the neck. He uses a gunstock finish to bring out a natural luster in the mahogany. The look is enhanced with two or three coats applied with a rag.

While the last coat of finish dries, Matt moves back to working on the gourd.

Figure A

Figure B

If a banjo can be thought of as basically a drum with a stick through it and some strings stretched over it, we now need a head for our "drum." A contemporary banjo maker will use a plastic pre-made but, since we are making a traditional type of banjo we want a traditional material -- either calfskin or goatskin. The large piece will need to be cut down to the right size.

Matt determines the size by adding about three and a half inches to the circumference of the gourd's hole. In this case he needs a head almost thirteen inches in diameter (**figure C**).

The calfskin is cut to size using a template as a guide. The template also breaks up the head into 16 equal "slices." Each segment gets two holes added using an ordinary hole punch (**figure D**). These holes will eventually guide the leather strips that hold down the head.

Figure C

Figure D

The calfskin is quite stiff and hard to manipulate but it becomes more pliable by soaking it in warm water for ten minutes. It's important not to over-soak the skin head as this could cause it to become slick, hard to handle and prone to ripping. When it's finished soaking, Matt pulls the head tight over the hole. The leather strip is threaded through the holes and around the pegs to hold down the calfskin..

Figure E

Wooden beads around the edge of the head here are installed -- not just for decoration -- but also to adjust the tension of the head over time. These beads were cut on a band saw but they can also be purchased from craft supply stores. Matt raises the beads just far enough to give just a little bit of resistance to the head (**figure E**). The head will shrink some as it dries.

With the head secure and tight, Matt can place a bridge on it and begin stringing up the banjo. Using an existing bridge as a template he draws a pattern on white pine. A rasp cuts away wood until a bridge like this one emerges. Matt cuts five string-grooves into the bridge with a file.

Next he cuts only four groves into the nut (**figure F**).

Figure F

Matt eases the violin pegs into the peg head (**figure G**) and adds the fifth one on the neck (**figure H**).

Figure G

Figure H

For the final time, he slides the spike through the gourd to join the two components. The painstaking effort was worth it, and the fit is perfect (**figure I**).

The leather tailpiece holds the strings opposite the peg head (**figure J**). The spike holds it in place by piercing one end of the leather. Five tiny holes cut into the leather hold the strings at the other end.

Figure I

Figure J

A contemporary banjo would use steel or nylon strings, but since we're building a traditional instrument we're going to go traditional all the way and use gut strings. Matt ties the end of each string to the tailpiece and then wraps them all around their respective pegs. Then, with a flip of the bridge (**figure K**) the banjo comes alive. Some adjustments are needed particularly in the bridge height (or the "action"), but Matt still thinks this one sounds pretty good right off the bench.

Figure K

Once the skin completely dried, it made for a nice, resonant sound. The beads around the perimeter can be used to tighten the head as needed later on. Matt also spent a good bit of time custom fitting the spike into the gourd. The overall result is a solid but very light construction and a stringed instrument with a haunting and beautiful sound.

The complete banjo project, start to finish, took Matt about 20 hours to complete.

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Authors: Robert L. Webb, Margaret Hutchinson
Publisher: Centerstream Publications (2nd edition, 1996)
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The How and the Tao of Old Time Banjo
Author: Patrick Costello
Publisher: Pik-Ware Publishing (September, 2003)
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Jubilee Community Arts is a regional, community cultural center dedicated to preserving and presenting the traditional arts of the Southern Appalachians. The organization's stated mission is "to promote, preserve and present the performing arts of the Southern region and to nurture the cultural milieu responsible for the birth and evolution of these and related art forms." The organization owns and operates the Laurel Theater, a 19th century converted church located in

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GUESTS:

Matt Morelock, luthier, banjoist, music teacher, happy camper.
On the web: http://www.wdvx.com/DJS/MattM.htm

- **ALSO IN THIS EPISODE:**
- Handmade Gourd-Banjo, Part 1: Preparing the Gourd Body
- Handmade Gourd-Banjo, Part 2: Building the Neck
- Handmade Gourd-Banjo, Part 3: Shaping the Neck and Peg-Head
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